WASHINGTON STATE DEPARTMENT OF ECOLOGY

January 2013

GENERAL USE LEVEL DESIGNATION FOR BASIC (TSS), ENHANCED, & PHOSPHORUS TREATMENT

For

Washington State Department of Transportation's Media Filter Drain (MFD)

Ecology's Decision:
Based on the Washington State Department of Transportation (WSDOT) application submissions, Ecology hereby issues the following use level designations for the WSDOT Media Filter Drain (MFD):

1. **A General Use Level Designation for Basic (TSS) Treatment.**
2. **A General Use Level Designation for Enhanced Treatment.**
3. **A General Use Level Designation for Phosphorus Treatment.**

   - **Design each MFD facility as per RT.07 of the WSDOT 2011 Highway Runoff Manual (HRM).**
   - **The MFD Ecology Mix will consist of materials identified in RT.07 of the WSDOT 2011 Highway Runoff Manual.**
   - **Construct the MFD facility as per RT.07 of the WSDOT 2011 Highway Runoff Manual.**

4. **Ecology approves CABS for treatment based on the water quality design flow rate per Section 4-3.1.1 of the WSDOT 2011 HRM. Calculate the water quality design flow rate using the following procedures:**
   - **Western Washington: For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using the latest version of the Western Washington Hydrology Model or other Ecology-approved continuous runoff model.**
   - **Eastern Washington: For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using one of the three methods described in Chapter 2.2.5 of the Stormwater Management Manual for Eastern Washington (SWMMEW) or local manual.**
   - **Entire State: For treatment installed downstream of detention, the water quality design flow rate is the full 2-year release rate of the detention facility.**
5. **These General Use Level Designations have no expiration date but may be revoked or amended by Ecology, and are subject to the conditions specified below.**

Ecology's Conditions of Use:

Media Filter Drains shall comply with the following conditions:

1. **Design, install, operate, and maintain the Media Filter Drain to comply with the 2011 HRM and the Ecology Decision.**
2. **Designers must follow any post publication updates to the HRM. You can find updates at the WSDOT HRM website: http://www.wsdot.wa.gov/Publications/Manuals/M31-16.htm**
3. **WSDOT shall maintain readily available those documents deemed public information and make this information available upon request and in a timely manner.**
4. **Discharges from the MFD shall not cause or contribute to water quality standards violations in receiving waters.**

Applicant: Washington State Department of Transportation (WSDOT)
Applicant's Address: Design Office
PO Box 47329
Olympia, WA 98504-7329

Application Documents:

- *Technology Evaluation and Engineering Report* : WSDOT Media Filter Drain; Prepared for Washington State Department of Transportation (Herrera Environmental Consultants, July 2006)

Applicant's Use Level Request:

General Level Use Designation for Basic, Enhanced, Phosphorus Treatment, and Oil Treatment in accordance with Table 2 of Ecology's 2011 *Technical Guidance Manual for Evaluating Emerging Stormwater Treatment Technologies Technology Assessment Protocol – Ecology (TAPE).*

Applicant's Performance Claims:

The Media Filter Drain removes suspended solids, phosphorus, and metals from highway runoff through physical straining, ion exchange, carbonate precipitation, and biofiltration. WSDOT expects the combination of treatment processes to achieve Ecology's treatment goals for basic, enhanced, and phosphorus treatment.

Ecology's Recommendation:

Ecology finds:

Ecology expects the Media Filter Drain, when sized according to WSDOT RT.07, to provide effective stormwater treatment achieving Ecology's basic, enhanced, and phosphorus performance goals as demonstrated by field testing performed in accordance with the TAPE

protocol; and Ecology deems the Media Filter Drain satisfactory with respect to factors other than treatment performance.

Findings of Fact:

1. WSDOT conducted water quality monitoring at the Media Filter Drain test site over a five-year period from 2001 to 2005.
2. WSDOT collected 25 sample events in three phases.
3. For the 12 storms with influent TSS concentrations less than 100 mg/L, the median influent was 59 mg/L and the median effluent was 3.9 mg/L. For the 13 storms with influent concentrations greater than 100 mg/L, the median percent removal was 96.0%.
4. For all storm events, the median percent removal of total phosphorus was 85.7% with a median influent of 0.234 mg/L
5. For all storm events, the median percent removal of dissolved zinc was 80.8% with a median influent of 120 µg/L.
6. For all storm events, the median percent removal of dissolved copper was 40.8% with a median influent of 16 µg/L.
7. WSDOT performed a water budget analysis on the Media Filter Drain to determine if losses were occurring within the system due to infiltration, bypass, and/or evaporation. The percentage of influent accounted for in the effluent ranged from 0 to 120 percent with a median of 38 percent. Bypassing the system did not likely cause water loss values because WSDOT only observed bypass on one occasion.

Technology Description:

The Media Filter Drain is a flow-through water quality treatment device developed for use where available right-of-way is limited and longitudinal gradients are less than 5%. The Media Filter Drain, which can be sited on both highway side slopes and medians, uses infiltration through a pervious, alkalinity-generating media, called the Ecology Mix, that was designed to remove suspended solids and soluble metals from highway runoff through physical straining, ion exchange, carbonate precipitation, and biofiltration. For illustrations, design specifications and maintenance criteria contact WSDOT.

Remaining Issues or Concerns about the MFD Technology:

1. Maintenance and replacement. How do pollutant removal efficiency and hydraulic capacity decrease over time, and at what point is maintenance or replacement required? WSDOT can accomplish this by periodic water quality testing at the SR 167 test site.

2. If possible, WSDOT should test a different MFD facility in the future. They should select the location to verify slope or soil-related siting limitations. The testing should carefully monitor water balance.

Contact Information: Applicant: Mark Maurer
Highway Runoff Program Manager
(360) 705-7260
maurerm@wsdot.wa.gov

Applicant's Website: http://www.wsdot.wa.gov/Environment/WaterQuality/default.htm

Highway Runoff Manual Website:
http://www.wsdot.wa.gov/Environment/WaterQuality/Runoff/HighwayRunoffManual.htm

Ecology web link: http://www.ecy.wa.gov/programs/wq/stormwater/newtech/technologies.html

Ecology: Douglas C. Howie, P.E.
Department of Ecology
Water Quality Program,
(360) 407-6444,
douglas.howie@ecy.wa.gov

Revision History

Date	Revision
April 2007	Original Draft use-level-designation document
February 2010	Revised Ecology Contact Information
January 2013	Modified Design Storm Description, added Revision Table, Revised format to meet Ecology Standards